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Aerification Effects on 'Innovation' Zoysiagrass Thatch and Quality

Jack Fry
Kansas State University, jfry@ksu.edu

Dani McFadden
Kansas State University, dmcfadden@k-state.edu

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Aerification Effects on ‘Innovation’ Zoysiagrass Thatch and Quality

Abstract

When a thatch layer accumulates on turfgrass it can be detrimental to the stand. A field experiment was initiated to investigate aerification treatments and their influence on organic matter, quality, and color of ‘Innovation’ zoysiagrass that was sodded within the past year. Turfgrass that was intensely aerified had less organic matter content in the surface inch of the profile compared to turfgrass that was not aerified. Color was also enhanced in treatments receiving aerification compared to nonaerified turf, which may have been attributed to trending of higher nitrate content in aerified plots.

Keywords

aerification, Innovation, zoysiagrass

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Aerification Effects on 'Innovation' Zoysiagrass Thatch and Quality

Jack Fry and Dani McFadden

Summary

When a thatch layer accumulates on turfgrass it can be detrimental to the stand. A field experiment was initiated to investigate aerification treatments and their influence on organic matter, quality, and color of 'Innovation' zoysiagrass that was sodded within the past year. Turfgrass that was intensely aerified had less organic matter content in the surface inch of the profile compared to turfgrass that was not aerified. Color was also enhanced in treatments receiving aerification compared to nonaerified turf, which may have been attributed to trending of higher nitrate content in aerified plots.

Objective

The objective of this research was to determine the influence of aerification on Innovation zoysiagrass.

Study Description

A field experiment was initiated in the summer of 2020 at the Kansas State University Olathe Horticulture Research and Extension Center in Olathe, KS, to determine the effects of aerification on reducing thatch in Innovation zoysiagrass, and impact on turf quality and rooting. The experiment was arranged in a randomized complete block design with three replicates. Treatments were imposed on June 26, 2020, and included no aerification, moderate aerification (one pass with aerifier, 63 hollow tines ft^{-2}), and intensive aerification (two passes with aerifier, 126 hollow tines ft^{-2}) (Figure 1). Turf quality was visually rated on a 1 to 9 scale (1 = poorest quality, 9 = optimum color, density, and uniformity), and turf color was visually rated on a 1 to 9 scale (1 = no color retention, 9 = dark green). Two cores measuring 2 inches in diameter and 1-inch deep were pulled from each plot on September 24, 2020, and

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tested for organic matter using weight loss on ignition (% by weight). Soil was also sampled on the same date from each plot for analysis of nitrogen (NO_3), phosphorus, and potassium.

Results

There was a decrease in organic matter when turfgrass was intensively aerified compared to turfgrass that was not aerified ($P < 0.10$) (Table 1). The amount of NO_3, phosphorus, and potassium in soil was not significantly different among treatments, although NO_3 was trending higher under intensively aerified turf. Moderate and intensive aerification resulted in greater root weights at a 0 to 3 cm depth when sampled three months after treatment (Table 2). Intensive aerification treatments were significantly lower in quality compared to no aerification treatments until 1 month after aerifying (Table 3). However, plots that were aerified moderately or intensively generally had a darker green color compared to plots that were not aerified.

Table 1. Influence of aerification treatments on organic matter and nutrient levels under Innovation zoysiagrass

Aerification treatment[a]	Organic matter[b]	Nutrient level		
		Nitrate	Phosphorus	Potassium
	% by weight	---------- ppm ----------		
None	14.6b[c]	14.4a	10.1a	302.7a
Moderate	11.6ab	14.6a	9.0a	316.7a
Intensive	10.2a	18.8a	10.8a	325.0a

[a] Study was initiated on June 26, 2020. Moderate aerification = 63 cores removed ft^{-2}; intensive aerification = 126 cores removed ft^{-2}.

[b] Each sample was oven dried at 220°F +/- 5°F, for more than 24 hours. Each dried sample was weighed and then ashed at 1,067°F for 6 hours. The ashed samples were weighed and the loss on ignition organic matter content weights were calculated.

[c] Means followed by the same letter in a column are not significantly different according to Fisher's LSD ($P \leq 0.10$).

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Table 2. Influence of aerification treatments on root dry weight of Innovation zoysiagrass

	Dry weight[a]		
Depth[b]	None	Moderate	Intensive
cm	---------- mg ----------		
0-3	380b[*]	611a	599a
3-6	62c	49c	86c
6-9	20c	37c	34c
9-12	11c	23c	32c

[a] Dry weights were recorded after a 48-hour oven dry-down period at 150°F.
[b] Root samples were collected on September 24, 2020, three months after aerification treatments.
[*] Means followed by the same letter are not statistically different within rows or columns according to Fisher's LSD ($P \leq 0.05$).

Table 3. Influence of aerification treatment on turf and quality and color of Innovation zoysiagrass in Olathe, KS, in 2020

Aerification	Quality[a]				Color[b]		
treatment[c]	6/29	7/6	7/24	7/31	7/24	7/31	8/24
None	6.3a[d]	6.7a	8.0a	7.3a	7.0b	6.0c	6.3b
Moderate	4.3a	6.0a	8.0a	7.0a	8.0a	7.0b	7.0ab
Intensive	2.7c	4.3b	6.3b	6.7a	8.7a	8.0a	7.7a

[a] Turf quality was visually rated on a 1 to 9 scale (1 = poorest quality, 9 = optimum color, density, and uniformity).
[b] Turf color was visually rated on a 1 to 9 scale (1 = no color retention, 9 = dark green).
[c] Study was initiated on June 26, 2020. Moderate aerification = 63 cores pulled ft^{-2}. Intensive aerification = 126 cores pulled ft^{-2}.
[d] Means followed by the same letter in a column are not significantly different according to Fisher's LSD ($P \leq 0.05$).

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Figure 1. Aerification treatments imposed on June 26, 2020, on Innovation zoysiagrass that was sodded in 2019.

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